

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER: Wright, G. C.

TITLE: APPARATUS FOR THE COOLING OF DRILLING LIQUIDS

Amendment A: SPECIFICATION AMENDMENTS

On page 2, please cancel paragraphs [009] - [0011].

On page 2, revise paragraph [0013] as follows:

The mud cooler is the offshore version of a series of world class drilling oil coolers that the applicant has developed for the oil-and gas industry. Special about this drilling oil cooler is that the drilling oil does not come into contact with the ultimate cooling medium seawater. This is possible because use is made of two separate heat exchangers 1 and 2, which are built up of titanium cooling plates. In the first heat exchanger 2 the drilling oil gives off its temperature to a mixture of water and glycol. In the second heat exchanger 1 this mixture in its turn gives off its warmth to the seawater.

On page 3, revise paragraph [0016] as follows:

The mud cooler MC 001 is built in a.. Ft container and weighs.. Kg. The onshore units are provided with one heat exchanger with titanium plates and are cooled with air. The offshore units are provided with two heat exchangers 1 and 2 with titanium plates. In the first heat exchanger 2 the drilling oil is cooled with a mixture of water and glycol.

On page 3, revise paragraph [0017] as follows:

This mixture in its turn is cooled in the second heat exchanger 1 with seawater. By using two heat exchangers 1 and 2 it is prevented, in the case of a leakage, that oil from the drilling oil can end up directly in the sea. Further as an extra safety measure sensors are provided on the seawater outlet in order to be able to detect at once any possible oil leakages.

On page 4, revise paragraph [0020] as follows:

The offshore drilling oil cooler or mud cooler is carried out with two plate type heat exchangers. The warm drilling oil is pumped through the first heat exchanger 2 and this is cooled by a mixture of glycol and water.

On page 4, revise paragraph [0021] as follows:

1. The mixture of glycol/water is circulated in a closed circuit through a second heat exchanger

On page 4, revise paragraph [0023] as follows:

On the seawater return pipe a sensor 3 is connected which detects at once any possible oil leakages.

On page 4, revise paragraph [0024] as follows:

At the drilling oil side as well as at the glycol/water side flowmeters 7 and 8 are connected.

On page 4, revise paragraph [0027] as follows:

By using two heat exchangers 1 and 2, it is prevented in the case of leakage of the drilling oil cooler that oil ends up directly in the sea.

On page 5, revise paragraph [0029] as follows:

Heat exchanger mud/glycol cooler The plate type heat exchanger 2 is equipped with titanium plates and provided with EPDM clip on sealing.

On page 5, revise paragraph [0031] as follows:

Heat exchanger glycol/seawater cooler 1.

On page 5, revise paragraph [0032] as follows:

The plate type heat exchanger 1 is equipped with titanium plates with EPDM clip on sealing. The capacity of the heat exchanger is 2000 kW based on a flow of 2000 l/min ethylene glycol with an inlet temperature of 59 °C and an outlet temperature of 45 °C. Seawater flow is based on 100 m³/hour with an inlet temperature of 25 °C.

On page 5, revise paragraph [0034] as follows:

Circulation pump 5.

On page 5, revise paragraph [0035] as follows:

The circulation pump is used to pump the ethylene glycol mixture through the plate heat exchangers of mud and glycol cooler in a closed circuit system. One central expansion tank 6 of approx. 50 ltrs will be mounted on the highest level and will be delivered with a Murphy levelswitch/gauge. The expansion tank 6 is also provided a make-up line to the circulation pump 5. The circulation pump 5 is of the vertical in-line type with a capacity of 2000 L/min at 16 mwc total head and is driven by a directly mounted explosion proof electric motor with an output of 7.5 kW at 400 V/50 Hz and 440 V/60 Hz.

On page 6, revise paragraph [0038] as follows:

The unit is complete with a flow meter on the mud line 4 and an oil detector 3 mounted on the seawater return line.